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10/580,036	05/19/2006	Yasuo Kobayashi	291327US26PCT	9532

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EXAMINER	
LOUIE, MANDY C	

ART UNIT	PAPER NUMBER
1792	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/580,036	KOBAYASHI ET AL.	
	Examiner	Art Unit	
	MANDY C. LOUIE	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 November 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) *7* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6, 8-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-3, 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akahori [US 6443165] in view of Ohmi [US 20030178144] and Fong [US 5882414], or alternatively Akahori in view of Ohmi and Fong and Yamazaki [US 6228751].

Regarding claim 1, Akahori teaches a method for cleaning plasma treatment system after depositing a fluorine containing carbon film (CF) film [abstract] on a substrate by using a plasma processing apparatus [col 3, ln 10-13] where the method include: mounting the substrate on the mounting table in the processing chamber [col 4, ln 5-7], forming a CF film of predetermined thickness on the surface of the substrate on the mounting table [col 4, ln 7-10], by supplying a rare gas into the plasma generation space [col 7, ln 1-3], supplying a film forming gas, which is a compound gas containing carbon and fluorine into the processing space through the gas supply openings of the gas supply member [col 7, ln 3-5], and activating the rare gas and the film forming gas by radiating microwave energies to deposit active species generated from the film forming gas [col 7, ln 10-25], unloading the substrate on which the film is formed out of

the processing chamber [col 7, ln 45-46], after unloading the substrate, supplying a cleaning gas containing oxygen into the plasma generation space (which will flow into the processing chamber) and radiating microwave energies to activate the cleaning gas for cleaning the inner surfaces of the processing chamber with oxygen active species generated from the cleaning gas [col 7, ln 45-64]. Akahori teaches the oxygen containing cleaning gas may also be combined with hydrogen gas [col 14, ln 37-45], wherein it would have been obvious to one of ordinary skill in the art that since the cleaning gas is subjected to a plasma, at least some oxygen and hydrogen radicals would be produced. Akahori also teaches a precoat process may be carried out after the cleaning process [col 21, ln 58-60], which includes supplying the film forming gas into the processing chamber and radiating microwave energies to activated the film forming gas, forming a precoat film of fluorine coating carbon on the inner surface of the processing chamber with active species generated from the film forming gas [col 21, ln 61-67; col 22, ln 1-15], where the precoat film is thinner (i.e. 2 micrometers) [col 22, ln 13] than the CF filmed on the substrate (i.e. 5 micrometers) [col 8, ln 18]. It would have been obvious to one of ordinary skill in the art to form a precoat after the cleaning process. One would have been motivated to do so to prevent particles from scattering during deposition and reduce contamination [col 22, ln 20-44]. Akahori appears be silent in teaching the particular plasma processing apparatus suggested by the Applicant. Ohmi remedies this.

Regarding claim 1, Ohmi teaches a plasma processing apparatus [abstract] comprising a processing chamber with a stage (mounting table) therein [0050], a flat

disk-like antenna body disposed at an upper portion of the processing chamber facing the stage, where the antenna body comprises a radial line slot antenna (plurality of slots) with the slots in a circumferential arrangement for radiating a microwave [0055; Fig. 3b] to radiate microwave energy [0055], a dielectric shower plate disposed under the planar antenna member which can function as an effective microwave-transmitting window (transmits the microwave radiated from the planar antenna member) [0051; 0055; Fig. 3a], and a conductive processing gas supply mechanism [0065] disposed between the dielectric plate and the stage to divide the inside of the processing chamber into an upper plasma generation space and a lower processing space [Fig. 3a], the gas supply member having a plurality of through-holes and a plurality of gas supply openings, the plasma generation space and the processing space communicating with each other through the through-holes [0067; 0077].

It would have been obvious to one with ordinary skills in the art at the time of the invention to apply plasma processing apparatus taught by Ohmi with Akahori to deposit a film. One would have been motivated to do so to improve film deposition (i.e. supplying a process gas uniformly and avoid temperature gradients) [Ohmi, 0021-0022].

Akahori in view of Ohmi appears to be silent in specifically cleaning a bottom surface of the dielectric plate. Fong remedies this.

Fong teaches a method for self-cleaning a blocker plate [title] with a plasma processing apparatus [abstract], where the prior art teaches providing a plasma of cleaning gases in both regions of an upper plasma generation space and a lower

processing space to thereby efficiently cleaning the bottom of the blocker plate [col 6, ln 10-24; 45-78].

It would have been obvious to one with ordinary skills in the art at the time of the invention to effectively clean the bottom surface of the dielectric plate with plasma of cleaning gases. One would have been motivated to do so to eliminate blockage that would cause non-uniformed deposition [Fong, col 2, ln 8-12] and develop a simpler and cost effective method that can be performed in situ rather than removing and replacing the entire gas diffuser system for cleaning [Fong, col 2, ln 54-56].

Alternatively, if Akahori in view of Ohmi and Fong does not seem to teach the cleaning gas further contains hydrogen to yield hydrogen radicals; Yamazaki remedies this.

Regarding claim 1, Yamazaki teaches hydrogen radicals effectively remove C-C bonds, wherein adding hydrogen radicals with oxygen radicals increases its removing effect due to these radicals reacting with carbon bond to form gases such as CO and so forth [col 4, ln 25-45]. The hydrogen radicals may be provided by providing a hydrogen gas in a plasma [col 4, ln 66-67]. Furthermore, the prior art suggests it would be desirable to remove the C-C bonds in order to effectively clean undesired deposits (i.e. CF film) within the chamber [Akahori, col 8, ln 25-44].

It would have been obvious to one of ordinary skill in the art to further provide hydrogen gas with oxygen gas as the cleaning gas so as to yield hydrogen and oxygen radicals under plasma. One would have been motivated to do so in order to effectively remove unwanted CF deposit.

Regarding claim 2, Akahori in view of Ohmi and Fong (and Yamazaki) teaches steps (d) and (e) are performed under the conditions that a dummy substrate is mounted on the mounting table in the processing chamber [Akahori, col 17, ln 63-65].

Regarding claim 3, Akahori in view of Ohmi and Fong (and Yamazaki) teaches the gas supplying member is made of aluminum alloy [Ohmi, 0065].

Regarding claim 8, Akahori in view of Ohmi and Fong (and Yamazaki) teaches teaches the process may be performed for each substrate being treated [col 3, ln 52-54] for a plurality of substrates [Akahori, col 21, ln 39] (the method repeating the steps of (a) to (e) in that order).

3. Claims 4-6, 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akahori in view of Ohmi and Fong (and Yamazaki), and further in view of Blalock [US 5417826].

Teaching of Akahori in view of Ohmi and Fong (and Yamazaki) is aforementioned, but appears to be silent in teaching the method further comprising between the steps (d) and (e) the step of (d1) by supplying a gaseous mixture of an oxygen containing gas and a rare gas into the processing chamber to oxidizing the surface of a gas supply member. Blalock remedies this.

Regarding claim 4, Blalock teaches it would be desirable to remove carbon fluoride deposit from the reactor parts [col 1, ln 50-67], wherein ozone is provide as the oxygen containing cleaning gas to remove the carbon-based residue [col 2, ln 37-40] such that a two step cleaning process (with an oxidizing gas) may be provided to concentrate cleaning particular areas of the reactor [col 4, ln 3-15], wherein one of

ordinary skill in the art would recognize that a change in gas flow into an evacuated reactor would change the pressure within the reactor. Although the Blalock does not explicitly teach radiating the cleaning gas to oxidize (clean) specifically the gas supply member, it would have been obvious to one of ordinary skill in the art to remove as much residue material from every part of the reactor (such as the gas supply member) so as to reduce contamination with efficiency. Furthermore, the prior art teaches a plasma gas such as Argon (rare gas) may be supplied with the cleaning gas during clean treatment [Akahori, col 14, ln 25-26].

Regarding claim 5, Akahori in view of Ohmi and Fong (and Yamazaki) and Blalock teaches the method further comprising between the steps (d) and (e) the step of (d1) by supplying a gaseous mixture of an oxygen containing gas and a rare gas into the processing chamber to oxidizing the surface of a gas supply member (as taught for claim 4). It would have been obvious to one of ordinary skill in the art at the time of the invention to omit the precoating step. One would have been motivated to do so in order to simplify the process and or to omit such step when it is not desired.

Regarding claim 6, Akahori in view of Ohmi and Fong (and Yamazaki) and Blalock teaches step (d) is performed under the conditions that a dummy substrate is mounted on the mounting table in the processing chamber [Akahori, col 17, ln 63-65].

Regarding claims 9-10, Akahori in view of Ohmi and Fong (and Yamazaki) and Blalock teaches the process may be performed for each substrate being treated [col 3, ln 52-54] for a plurality of substrates [Akahori, col 21, ln 39] (the method repeating the steps of (a) to (e) in that order).

Response to Arguments

4. Applicant's arguments with respect to claims 1-6, 8-10 have been considered but are moot in view of the new ground(s) of rejection as necessitated by applicant's amendment of hydrogen radicals generated from the cleaning gas and the method further comprising supplying a gaseous mixture of oxygen containing gas and a rare gas.

5. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., uniformly forming the thickness of the precoat, on pg. 9 of remarks) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

6. In regards to applicant's argument of distinguishing the cleaning step and oxidizing step, the examiner disagrees that a cleaning step would not be able to provide oxidative properties to a surface of a gas supply member since the cleaning gas also includes oxygen radicals, wherein the applicant relies upon features of the oxidizing step (i.e. by the oxidizing step, an oxide film having high adhesivity is formed on the surface of the gas supply member) to distinguish from the cleaning step, wherein such features are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

1. No claim is allowed.

2. All the pending claims are subject to restriction/election requirement.

3. Claim 7 is withdrawn from restriction election.

4. Claims 1-6, 8-10 are rejected for the reasons aforementioned.

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MANDY C. LOUIE whose telephone number is (571)270-5353. The examiner can normally be reached on Monday to Friday, 7:30AM - 5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571)272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. C. L./
Examiner, Art Unit 1792

/Timothy H Meeks/
Supervisory Patent Examiner, Art Unit 1792